

CLAIMS

1. A method for determining the concentration of an additive X of an electrochemical bath that includes at least one further component Y, the method comprising:
providing a predetermined amount of a starting solution, the starting solution comprising virgin makeup solution that is saturated with the further additive;
extracting an amount of the electrochemical bath for measurement;
adding a predetermined amount of the extracted electrochemical bath to the predetermined amount of the starting solution to form a mixed solution;
executing at least one electroanalytical measurement cycle using the mixed solution;
comparing results of the electroanalytical measurement cycle with a known measurement standard.
2. The method of claim 1 wherein a plurality of electroanalytical measurement cycles are executed using the mixed solution and wherein the mixed solution used in the electroanalytical measurement cycles comprises mixed solutions having different amounts of the extracted electrochemical bath added thereto.
3. The method of claim 1 wherein the at least one electroanalytical measurement cycle comprises cyclic voltammetric stripping.

4. The method of claim 1 wherein the at least one electroanalytical measurement cycle comprises cyclic pulse voltammetric stripping.
5. The method of claim 1 wherein the known measurement curve is obtained by executing a plurality of electroanalytical measurement cycles using a standardized solution comprising virgin makeup solution that is saturated with the additive X and the further component Y.
6. The method of claim 1 wherein the additive X is an electroplating suppressor.
7. The method of claim 1 wherein the component Y is an electroplating enhancer.
8. A method for determining the concentration of suppressor in an electroplating bath that also includes an electroplating enhancer, the method comprising:
providing a predetermined amount of a starting solution comprising virgin makeup solution that is saturated with the enhancer;
extracting an amount of the electroplating bath for measurement;
adding a predetermined amount of the extracted electroplating bath to the predetermined amount of the starting solution to form a mixed solution;
executing at least one electroanalytical measurement cycle using the mixed solution;

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comparing results of the at least one electroanalytical measurement cycle with a known measurement curve.

9. The method of claim 8 wherein a plurality of electroanalytical measurement cycles are executed using the mixed solution and wherein the mixed solution used in the electroanalytical measurement cycles comprises mixed solutions having different amounts of the extracted electroplating bath added thereto.
10. The method of claim 8 wherein the at least one electroanalytical measurement cycle comprises cyclic voltammetric stripping.
11. The method of claim 8 wherein the at least one electroanalytical measurement cycle comprises cyclic pulse voltammetric stripping.
12. The method of claim 8 wherein the known measurement curve is obtained by executing a plurality of electroanalytical measurement cycles using a standardized solution comprising virgin makeup solution that is saturated with the enhancer and suppressor .

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13. A method for determining the concentration of an additive X of an electrochemical bath that includes at least one further component Y, the method comprising:
providing a predetermined amount of a starting solution, the starting solution comprising virgin makeup solution that includes a predetermined amount of the further additive;
extracting an amount of the electrochemical bath for measurement;
adding a predetermined amount of the extracted electrochemical bath to the predetermined amount of the starting solution to form a mixed solution, the mixed solution being saturated with the at least one further component Y;
executing at least one electroanalytical measurement cycle using the mixed solution;
comparing results of the electroanalytical measurement cycle with a known measurement standard.

14. A method for determining the amount of an electrochemical bath additive that is to be automatically added to an electrochemical bath by a dosing system, the amount of the electrochemical bath additive that is to be added being dependent on a measurable value related to an amount of a component X in the electrochemical bath, the electrochemical bath also including at least one further component Y, the method comprising:
providing a predetermined amount of a starting solution, the starting solution comprising virgin makeup solution that is saturated with the further component Y;
automatically extracting an amount of the electrochemical bath for measurement;

automatically adding a predetermined amount of the extracted electrochemical bath to the predetermined amount of the starting solution to form a mixed solution;
automatically executing at least one electroanalytical measurement cycle using the mixed solution;
automatically using the results of the electroanalytical measurement cycle to determine the amount of additive that is to be dispensed by the dosing system.

15. The method of claim 14 wherein the electroanalytical measurement cycle comprises cyclic voltammetric stripping.

16. The method of claim 14 wherein the electroanalytical measurement cycle comprises cyclic pulse voltammetric stripping.

17. An automated chemical management system comprising:

a bath extraction system connected to extract an amount of an electrochemical bath from an electrochemical processing unit, the bath extraction unit being adapted to extract an electrochemical bath that is comprised of a first bath additive, the amount of which is to be determined by the automated chemical management system, and a second bath additive,
an electroanalytical measurement system including a container in which electroanalytical measurements are conducted, the container being adapted to hold an amount of virgin makeup solution that is saturated with the second bath additive,

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a programmable control system connected to control the bath extraction system and the electroanalytical measurement system, the programmable control system being programmed to direct the bath extraction system and electroanalytical measurement system for execution of a series of operations to determine the amount of the first bath additive in the electrochemical bath that has been extracted from the electrochemical processing unit, the operations comprising

extracting an amount of the electrochemical bath from the electrochemical processing unit

for measurement of the amount of the first bath additive therein,

dispensing an amount of a virgin makeup solution that is saturated with the second bath

additive into the container to form a mixed bath,

executing at least one electroanalytical measurement cycle using the mixed bath,

determining the amount of the first bath additive in the extracted electroplating bath using

one or more measurements obtained in the at least one electroanalytical

measurement cycle using the mixed bath.

18. The automated chemical management system of claim 17 wherein the first bath additive is an electroplating suppressor in the second bath additive is an electroplating enhancer.

19. The automated chemical management system of claim 17 wherein the electroanalytical measurement system executes cyclic voltammetric stripping.

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20. The automated chemical management system of claim 17 wherein the electroanalytical measurement system executes cyclic pulse voltammetric stripping.
21. The automated chemical management system of claim 17 wherein the programmable control system determines the amount of the first additive by comparing one or more measurements obtained during the at least one electroanalytical measurement cycle to one or more measurements obtained using a standardized solution, the standardized solution comprising virgin makeup solution that is saturated with both the first and second bath additives.
22. The automated chemical management system of claim 17 and further comprising a chemical dosing system connected to dispense an amount of the first bath additive based on the amount of the first bath additive as determined by the programmable control system.

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